

EUROPEAN PATENT OFFICE
as the
INTERNATIONAL PRELIMINARY
EXAMINATION AUTHORITY under PCT
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y. ref: PCT/PL03/00040

o. ref.: A/N-1010/901/961-4

Warszawa, September 20, 2004

**Re: the second Written Opinion (PCT Rule 66) mailed on June 21, 2004
issued with respect to International Patent Application No.
PCT/PL03/00040 in the name of Ammono Sp. z o.o. et al.
Due date: September 21, 2004**

Dear Sir,

This is the reply to the second Written Opinion under PCT Rule 66 as mailed on June 21, 2004.

1. The Applicants appreciate the positive opinion on novelty of claims 1-20 directed to a process for obtaining bulk gallium containing nitride monocrystals.
2. As regards novelty of claims 21-24 the Applicants respectfully bring your attention to the information comprised on page 7 of the specification as filed informing about the advantages achieved by the new process according to the present invention, namely reduction of oxygen content in the obtained bulk nitride monocrystals. This is a new quality of the monocrystals as compared to those resulting from the process disclosed in D1 and also those known from the earlier PCT applications in the name of the same Applicants, namely; PCT/IB01/04185 and PCT/PL02/00077. Since the bulk nitride monocrystal products have a novel feature than it is believed that the use of the same as a substrate for epitaxy has also some advantages over the prior art, especially when n-type electrically conductive layers may be of interest. It is believed that such novel characteristics may provide a basis for recognising the novelty of the claims 21-22, especially in view of the following:
 - a) Azides are available as 5N grade products (see the examples) and are far less hygroscopic than other mineralizers used thus according to prior art. Thus less

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water and oxygen is introduced to the system with the starting materials and less oxygen impurities can therefore be included in the bulk nitride monocrystals obtained.

b) The Applicants are in a possession of experimental evidence which confirms that in two otherwise identical processes of re-crystallization of gallium nitride from supercritical ammonia-containing solution, in which different mineralizers were used, the oxygen content in the obtained gallium nitride bulk monocrystals – determined by GDMS (Glow Discharge Mass Spectroscopy) is 2-5 ppm when sodium azide NaN_3 has been used as mineralizer, while the respective value is 30-80 ppm when metallic sodium has been used as mineralizer.

Thus it is believed that claims 21-24 are allowable as they are.

3. In case the novelty of the claims 21-24 presently on file cannot be admitted in spite of the above explanations an auxiliary request is made for considering the following amendment to claim 21:

“21. A bulk nitride monocrystal obtained by a process according to any one of the preceding claims 1 to 20, **having reduced content of impurities, especially oxygen.**”

Such impurities are unavoidably introduced in prior art processes where non-azide mineralizers containing Group I elements are used.

4. As regards novelty of product claims 25-30 the Applicants respectfully submit an amendment to independent claim 25 to read:

“25. Mineralizer **for use in a process according to anyone of the preceding claims 1-20** [used for supercritical ammonia-containing solution], which comprises at least **two** [one] compounds selected from the group consisting of LiN_3 , NaN_3 , KN_3 , and CsN_3 .”

It is believed that the amendments proposed (added text is shown in bold characters and eliminated text is shown in underlined characters) make the claims allowable both in view of art. 6 PCT and as far as the novelty is concerned. Even though the azides are known per se the combination of at least two azides of Group I elements is a novel product meant for use in the process for obtaining bulk monocrystals of nitride of Group XIII elements by means of recrystallization from supercritical ammonia-containing solution. Support for the proposed amendment can be found in working Example 8, where sodium and potassium azides are used as mineralizer.

5. The Applicants believe that in view of the above explanations the claims 1-24 and 26-30 as filed and claim 25 as currently amended define a patentable invention, i.e. novel, industrially applicable technical solution involving an inventive step, so that a positive International Preliminary Examination Report is respectfully solicited.

In case claims 21-24 as filed cannot be accepted yet, please consider the

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auxiliary amendment of claim 21 as proposed under # 3 above and if necessary please communicate with the undersigned informally over the phone. Should it be necessary an issuance of further Written Opinion pursuant to Rule 66 PCT is respectfully requested.

In anticipation of favorable response, I remain

Yours faithfully,

Ewa Malewska,
Patent Attorney

Enclosures:

- clear copy of the proposed amendments of the claim 25
- marked-up copy of the proposed amendments of the claim 25
- clear copy of the amendment of the claim 21 according to the auxiliary request
- marked-up copy of the amendment of the claim 21 according to the auxiliary request

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